Reporting Federal Activities . . .

Higher Education

Features for NOVEMBER 1960

Education and Security

By BOWEN C. DEES

Educational Legislation in the 86th Congress

By CHARLES W. RADCLIFFE

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Education

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Education and Security

By BOWEN C. DEES*

THE United States has long since passed the point of no return in its continuing and increasing reliance on science and technology for economic well-being, for increased comfort and convenience, and for national defense. No amount of financial wizardry, no amount of juggling of economics, no amount of managerial ingenuity can hope to replace even partially the function of the scientist and the engineer in today's modern nation. Our vaunted American way of life is crucially dependent on the manner in which we develop and utilize our scientific and technological resources, and uppermost in importance among these resources are the men and women, boys and girls who have been—or who can be—educated to contribute to the scientific endeavor.

Some say that we are already placing too much stress on science and engineering in this country. They argue that there are other important fields—fields which are of greater significance to our moral and spiritual growth—and that too much emphasis on science and technology will eventually undermine our democratic traditions through overstressing materialism. This argument, in sum, holds that we should somehow put a checkrein on science and its applications, and accelerate developments in other fields.

But why should any culture wish to cut off—or immobilize—its strong right arm? Logic demands that we continue to develop our scientific and technological capabilities, not inhibit their growth. Whether we *should*, in some philosophical sense, rely as much as we do on science and technology is essentially a meaningless question. We *do* rely on them, and we will continue to do so. Moreover, they are important to our culture, and deserve concern for the intellectual worth of their contributions.

Security, as I would like to use the word, does not simply mean safety from military attack. Let me remind you that the word "secure" comes to us from the Latin, and its literal meaning is "without care." The cares of men are many, and stem from such problems as bodily illness, lack of suitable shelter, inadequate clothing, hunger, and the threat of enemy attack. In the United States, many millions of people have largely achieved freedom from want, and in our domestic lives we rarely have cause to fear bodily harm. But—at the same time—international tensions and the brooding threat of ICBM's and their nuclear warheads have created a new set of worries.

We cannot exorcise these cares by ignoring them. Nor would they be less fearful if we were to stop our own research, development, and production efforts

*Assistant Director for Scientific Personnel and Education, National Science Foundation. Dr. Dees holds the A.B. degree from Mississippi College (1937) and the Ph. D. degree from New York University (1942). He served as graduate assistant, New York University, 1937–42; instructor (physics), 1942–43; professor (physics), Mississippi College, 1943–44; instructor of electrical communications, Radar School, Massachusetts Institute of Technology, 1944–45; assistant professor of physics, Rensselaer Polytechnic Institute, 1945–47.

From 1947 to 1950 Dr. Dees served the Government as physicist, Scientific & Technical Division, General Headquarters, Supreme Commander for the Allied Powers, Tokyo. He served subsequently as Division Chief, Scientific & Technical Division, General Headquarters, Supreme Commander for the Allied Powers, Tokyo, 1950–51; program director for fellowships, National Science Foundation, 1951–56; and deputy assistant director for scientific personnel and education, National Science Foundation, 1956–59. He assumed his present position in 1959.

This article is adapted from an address given by Dr. Dees at a symposium on Long Range Air Force Qualitative Educational Requirements, October 17, 1960, Washington, D.C. (*See p. 13*)

in the defense sector. We cannot eliminate care, no matter what we do; but we can continue to discover ways of minimizing the causes of our anxieties. And, in doing so, we improve our security. To reduce the impact of care—and thus to increase our security in the broader sense—we must try even harder to achieve the goals we have long had for our people: Elimination of material distress, reduction of the effects of disease, provision of an acceptable standard of living for everyone. To reach these goals we will have to use even more fully than heretofore the potentialities of science and its applications.

You may feel that I am belaboring the obvious. It seems important to me to demonstrate unequivocally that the security of our Nation (using the term in either its broad or its narrow sense) depends upon an adequate base of scientific and technological competence. Incredible as it seems, this fact is not yet fully recognized by our people. Our national experience has in some ways been too favorable. Blessed with abundant natural resources, and happening along just in time to take full advantage of the industrial revolution, the United States has been able to "leap forward" as no other nation has done before us. Our inventiveness—in commerce, industry, and government as well as in technology—and our pioneer spirit have maintained our rate of progress. But we now find ourselves in a very different era—almost in a new dimension, as it were—and the rules of the game have shifted.

The industrial revolution gave *us* a push. The scientific revolution is supplying a comparably impressive impulse to the Soviet Union's drive for world leadership and world conquest.

Perhaps the most dangerous threat to our freedom today lies in the fact that the Soviets are placing much greater emphasis on science and its applications than we are. The stress on science in their schools and universities has been widely publicized; many of us have been inclined to react by claiming that our education system, taken as a whole, is better than theirs. But an objective analysis of the problem leads toward the conviction that we do need to improve our own approaches and that minor repairs may not be adequate.

All of us need to realize that we are engaged in a struggle with an adversary that has placed a much higher priority on science and technology than any other nation. Nine of the fifteen all-powerful members of the Presidium of the Central Committee of the Communist Party were trained as scientists or as engineers. Two-thirds of the 63 members of the Council of Ministers of the U.S.S.R. had their training in these fields. What these figures mean is subject to debate, since most Russians who have had collegiate-level training were educated in science or engineering. The fact remains that those who guide the destinies of the U.S.S.R. are aware of the potentialities of science and intend to press their countrymen toward the fullest possible realization of these potentialities.

Despite the Russian challenge, we must not tolerate a situation where any one of the important segments of our culture is given preferential treatment—that is to say treatment which is better than it deserves. To ask that science and technology be provided a unique or quasi-sacred position would be absurd. To ask that sufficient attention be given these fields so that they can fully contribute to the national welfare is something quite different. And it is my conviction that the conditions which exist today still do not assure an adequate flow of talent into science and engineering for our long-range welfare.

I have already pointed out that the needs of the Nation extend much further than do the boundaries of the sciences. We need artists and musicians, ministers and poets. We need more social scientists, men and women who can serve as the interpreters and analysts of the complex creature that we think of as "an industrial society." Even to obtain the greatest advantages from the natural sciences these people are needed. James Killian commented on this point a few weeks ago. As he put it: "It's going to take great wisdom and management to see that scientific development is applied wisely, to the quality as well as the quantity of human life. . . . We will . . . need a new brand of administrator to handle our great system's developments—computers, missiles, communication satellites. This type of man, who knows both the technical and the administrative side, is one of our greatest shortages. Some of our worst failures in space and weapons have come from a lack of this kind of man." [1] It is obvious that broadly educated people—people who combine scientific, technological, economic, and

[1] Arthur Herzog, "A Visit with Dr. James R. Killian," THINK, September 1960, p. 22–23.

military expertise—are essential to the adequate functioning of an up-to-date military service. Not so obvious, perhaps, is the fact that similar breadth of training is becoming more and more important in Government agencies, in administrative posts in industry, and even in such enterprises as banks and investment brokerage houses.

I have tried to be consistent in using the phrase "science and technology" (or the appropriate variant), because it seems important to me to emphasize the distinctive nature of each of the two terms. Technology grows out of science and is therefore the secondary element of the pair. But science is also dependent on technology for *its* progress. The development of transistors is a particularly good example of the application of physical principles to the "planned invention" of a new device. Their initial discovery and later development were closely related to the theoretical work of solid-state physicists. Now that transistors of good reliability are available, they are proving useful in myriads of ways in the basic research laboratories of the world. Transistors are rapidly revolutionizing an entire industry; this is a fact one associates with the technological aspects of these electronics devices. The fact that they are also indispensable in many scientific experiments now going forward is an example of the symbiotic relationship between science and technology. Technology's sustenance comes from the sciences, but the feedback from technology by way of improved tools and techniques contributes to major scientific advances and makes many of them possible.

Since technology grows out of science, the technologist's education, like the scientist's, must be grounded in fundamental principles. The annual input of newly discovered facts increases to an ever more unattainable point the difficulty of learning all of science—or even all of one specialty. We cannot hope to teach oncoming generations all the known facts: we *can* hope to give them an understanding of those basic principles which help to explain large groups of facts and ideas. It is just as important for us to concern ourselves with the adequate education of our technologists as it is for us to worry about the quality of education of the next generation of scientists. The two groups are separate, but they are interconnected and interdependent in a way which makes necessary their close and harmonius cooperation.

I would like to deal with the question of improving science and engineering education.

The simple fact is that we do not know how to improve education in the United States. We think we know some of the things that need to be done at certain levels and in some fields. But we are inclined to grossly oversimplify this problem. On educational matters, everyone is an expert: scientists turn out to be quite unscientific in their points of view, and they are joined by scholars from many other fields. Why is it that a chemist who insists on checking and rechecking his experimental results sees no inconsistency in diagnosing and prescribing for the complex ills of an educational system with which he has had little or no direct contact? Not long ago I heard a Nobel laureate in science say without qualification that the one most helpful thing that we could do to improve education in the public schools was to do away with teachers' colleges. He *may* be right, but he cannot present objective and compelling evidence of the kind he would insist on developing prior to making a comparably categorical statement regarding his own field. A well-known naval officer has made a serious effort over the last few years to tell the American people how education in this country can be improved, basing his suggestions on ideas which are plausible to some, convincing to a few, and highly resented by many others. I repeat: neither he nor anyone else *knows* how to improve education in the United States. The various claims and counterclaims for specific ways of improving education in the United States do not fit into any overall pattern of proven theory.

Our educational system has evolved to meet changing needs and to adjust to our various national moods. We have no reason to be ashamed of the result. But we are now facing a period in our development when a quickening of the pace of change and improvement is imperative. To bring about the changes which will result in the best possible education for our coming generations, we must study the educative process in a more thorough and significant way. The principles of systems analysis—or operations research—have been applied with increasing success to military and industrial problems. A comparable—and large-scale—attack on the question "What should we do to improve American education?" is long overdue.

One of this Nation's most outstanding mathematicians sought and obtained support some time ago to

study for 6 months the problems of teaching arithmetic and elementary geometrical concepts in the lower grades. When he undertook this study, he thought that he could quickly obtain a number of ideas and some insight by simply referring to research literature dealing with the teaching of arithmetic to young children. He was fearfully disappointed. In his view, there is literally *no* scientifically valid body of theory available today on how one can best approach the teaching of the third "R" in our schools. Interesting and potentially significant experiments are underway (conducted mainly by Europeans), but learning theory in this field—and in others—is still in its infancy.

There are a few important exceptions, but far too much of the research on education that has been carried out in the United States to date has been done by individuals or small groups of individuals, and their work has been confined to problems of relatively limited scope. Moreover, the approaches used in much of this research are necessarily inadequate, primarily because the more elaborate studies that are clearly desirable cannot even be considered in view of our limited resources of funds and workers. If this statement is viewed as an indictment, it should be clear that it is not only an indictment of our educational leadership but of our whole society. All of us who have responsibilities relative to educational progress must accept some of the blame for this condition.

The American people are dedicated to education. We are currently supporting research and development in the United States at a prodigious rate. Virtually all of the research and development is carried out by individuals who are products of our educational system. Yet we have somehow failed to realize that research on the educational process is as important as research on fusion, on cancer, or on satellite instrumentation.

We are producing approximately 5 million vehicles annually in the United States; assuming a price of $3 thousand each, sales of the basic product of the automobile industry are approximately $15 billion; add the petroleum products we use and the total reaches $25 billion. Our formal educational enterprise is operating at about the same dollar level. But let us contrast the research situation in the automobile industry with the situation that we find in education. The funds required to maintain the impressive research establishments of the automobile manufacturers are out of all proportion to the funds available for support of educational research. Yet the research efforts of these laboratories are augmented in many ways by the laboratories of the steel producers, the petroleum companies, and the universities.

Educational research of the kind for which I am pleading will demand large sums of money, and it will require the active interest of persons who have considered research in education to be outside their fields of interest; many of those who are essential to this effort have unfortunately considered such research beneath their dignity. The task of learning how to improve education in the United States must command the interest and active participation of scholars and practitioners from all fields—historians and physicians, architects and sociologists, scientists and engineers, and many others. Educators who are familiar with the educational system in all of its ramifications must obviously be involved. But democracy's stake in education is too great to leave the task of analyzing our problems and charting our future course in the hands solely of those who are specialists in the field—just as our stake in remaining free is too great to leave all decisions relative to defense in the hands of the military establishment.

We have been too much inclined to separate education into small compartments and to think of these compartments as being units which can be studied individually: the frequent use of the word "articulation" underscores this point. We need to examine the education system as a single entity. The various component parts must obviously be studied, and in greater depth and more comprehensively than heretofore, but we should also at least try to learn the characteristics of the entire organism.

I am under no illusions here. Several years of experience, working with professional groups who have undertaken to carry out simply one small piece of this huge task, have convinced me that the problem we face is both massive and tremendously difficult. In terms of its intellectual challenge it is probably several orders of magnitude more difficult than developing ICBM's—or nuclear submarines. In terms of cost, an effective program will require many times more money than the Nation has heretofore been willing to spend for such efforts.

The Air Force, respresenting as it does one of the units in our Nation which is strongly dependent on

Continued on page 17

New Legislation of Interest to Higher Education

Review of laws enacted during the Second Session of the 86th Congress

By CHARLES RADCLIFFE*

ONE of the last acts of the 86th Congress, which adjourned its second session on September 1, was to attach to a minor bill a $500-million increase in the loan authorization ceiling of the College Housing Loan Program. The Congress thus provided interim relief for college and university housing financing. This bill was signed by the President on September 14, 1960, and became Public Law 86–788.

The backlog of college housing loan requests pending before Housing and Home Finance Agency now approximates $300 million, so that the additional loan authorization will be absorbed largely in meeting pending requests. There remain unresolved the urgent questions of whether Federal assistance will be provided for financing academic, administrative, and related college facilities, and the nature and extent of such assistance if it is provided. Both the House and Senate committees having educational jurisdiction held hearings on these matters during the past summer. The Senate Committee has expressed its interest in having the Department of Health, Education, and Welfare, Office of Education, continue the background studies on financing higher education construction, and there is every indication that proposals for additional Federal assistance for higher education will be given early consideration in the 87th Congress.

Enactments of the Second Session of interest to higher education, with date of enactment and a brief descriptive summary of the provisions of the act are listed below. Enactments of the 1959 session of the 86th Congress are listed in the November 1959 issue of *Higher Education.*

P.L. 86–472, May 14, 1960 (Mutual Security Act). Establishes East-West Cultural Technical Exchange Center in Hawaii; advisory study on feasibility of Point Four Youth Corps to train young people to serve abroad in programs of technical cooperation; Secretary of State to submit a program and plan for the establishment of Hemispheric Cultural and Technical Exchange Center in Puerto Rico. (All under Department of State.)

P.L. 86–550, June 29, 1960. Makes American nationals eligible for scholarships and fellowships authorized by the National Science Foundation Act of 1950.

P.L. 86–610, July 12, 1960. Establishes a National Institute for International Health and Medical Research to provide for international cooperation in health research, research training, research planning; gives grants and loans to individuals and educational institutions for research and research training.

P.L. 86–624, July 12, 1960. Hawaiian Omnibus Act. Includes Hawaii, as a State, in all Federal educational programs.

P.L. 86–644, July 14, 1960. Extends reduced postal rates for library books to other library items including audiovisual materials and bound volumes of periodicals.

P.L. 86–658, July 14, 1960. Substantially increases Bankhead-Jones Act teaching grants to land-grant colleges. This is the only increase in the amount of these grants since enactment of the legislation in 1935.

P.L. 86–678, August 31, 1960. State, Justice, and related agencies appropriations for 1961. Includes $10 million for East-West Cultural and Technical Exchange Center in Hawaii and funds for international educational exchange programs.

P.L. 86–686, September 2, 1960. Authorizes Secretary of Interior to make cooperative research agreements and initiate cooperative training programs with colleges and other agencies in field of wildlife conservation.

P.L. 86–703, September 2, 1960. HEW appropriations for fiscal year ending June 30, 1961. Includes $173,050,000 for NDEA program.

*Mr. Radcliffe is Legislative Reference Officer in the Legislative and Program Development Branch of the Office of Education, U.S. Department of Health, Education, and Welfare. A short biographical sketch appears in the November 1959 issue of *Higher Education.*

P.L. 86–720, September 8, 1960. Amends Public Health Service Act to authorize project grants for graduate training in public health.

P.L. 86–722, September 8, 1960. Second Supplemental Appropriation Act for fiscal year ending June 30, 1961. Includes additional amount of $14,430,000 for Student Loan Program, bringing total appropriation for that program for fiscal 1961 to $58,430,000 and for all NDEA programs to $187,480,000.

P.L. 86–785, September 8, 1960. Authorizes education benefit payments for children of veterans dying of service-connected disability after January 31, 1955, until end of Universal Military Training Act.

P.L. 86–788, September 14, 1960. Increases by $500 million the loan authorization ceiling for College Housing Loan Program (of which $50 million is reserved for "other educational facilities" and $50 million is reserved for housing for nurses and interns in hospital teaching programs).

P.L. 86–798, September 15, 1960. Authorizes Public Health Service to make public health research grants to universities, hospitals, laboratories, and other public or nonprofit institutions.

These are the major enactments of the Second Session of the 86th Congress that are of interest to higher education. At this point, with a new national administration taking office in January of 1961, it is impossible to form a clear view of the legislative program to be placed before the 87th Congress. Almost certainly, however, such a program will include amendments to the National Defense Education Act and a further consideration of construction assistance for higher education. Beyond this, the Congress itself would appear to have certain continuing interests in proposals such as those for grants-in-aid for the encouragement of educational television and for extension of educational benefits for peacetime servicemen. Proposals along this line passed the Senate during the 86th Congress but did not get beyond committee consideration in the House. Another proposal which appears to receive increasing Congressional interest and attention is that for some form of additional tax relief for taxpayers who incur expenditures for the higher education of themselves or their dependents.

Whatever the outcome of these and other legislative proposals, the national concern for and interest in higher education will be reflected by the Congress. It will therefore be more important than ever that individuals and institutions responsible for the direction of higher education carefully consider the implications of higher education proposals in the Congress, in order that the Federal role may be constructive.

Office of Education Studies and Surveys

Survey of Placement Services

THE DIVISION of Higher Education, Office of Education, is conducting a study of the nature and extent of higher education placement services offered by private associations.

The study covers placement in all academic and administrative positions, including those with duties related to admissions, registration, planning and development, public relations, business and accounting, purchasing, buildings and grounds, residence halls, food services, bookstore, library, student health. Topics being investigated include geographical, subject, and position limitations of placement services; fees; financing; and internal organization of service.

A report of this study should be available by June 1961. It will include a directory of placement facilities, a brief description of the study, and an analysis of the problems in this area. The results should be of value to colleges and universities seeking personnel, to faculty members wishing to secure or change positions, and to all higher education placement services.

In a meeting on January 25, 1960, the Office of Education and the American Council on Education devised the study as a move toward defining the current complex network of higher education placement facilities. On March 9, 1960, a group of eminent educators in the field of placement gathered in Chicago, at the request of Robert Poppendieck,

Office of Education specialist for teacher education, to assist in developing a working paper on "Improving Higher Education Through Better Placement." Dr. Poppendieck is conducting the study with the assistance of Lanora Lewis, research assistant.

Some 200 privately supported associations concerned with higher education will receive questionnaires from the Office by the first week in November concerning this heretofore unexplored area. Dr. Poppendieck strongly urges that all organizations which belong within the scope of this study and which have not received a questionnaire report as soon as possible to him at the Division of Higher Education, Office of Education, Washington 25, D.C., so that they may be included.

Survey of Mathematics Programs Launched

A SURVEY of graduate and undergraduate mathematics programs in approximately 900 colleges and universities is being conducted this fall by the Office of Education. The study, *Survey of Mathematics Programs in Institutions Granting Bachelor and Higher Degrees*, is being conducted by Office specialist, Clarence B. Lindquist, Chief for Natural Sciences and Mathematics.

The respondents in the survey will be heads of mathematics departments in the various institutions. At the undergraduate level the survey inquires into kinds of curriculums offered leading to degrees; credit requirements in mathematics; credit requirements in professional education in curriculums which prepare teachers; typical curriculums for various types of students; admission and placement examination practices; advanced standing; prerequisite instruction; honors programs; use of instructional techniques other than lecture-recitation; mathematics library facilities; special equipment for mathematics instruction; and innovations in programs since 1950.

At the graduate level master's and doctoral programs in mathematics will be studied, Dr. Lindquist says, as well as programs especially designed for the teaching of mathematics. Topics to be investigated include such requirements as number of credit hours in mathematics and total number of credit hours; examinations; foreign languages; and minors. The specializations in mathematics offered by each institution will be determined as well as the number of doctoral degrees conferred in each specialization since January 1958. The survey inquires about programs which some institutions conduct especially to prepare graduate students for careers in college teaching. And, finally, in order to determine trends, each respondent is asked to describe innovations in graduate mathematics programs which have taken place since 1950.

Attitude Study Approved

THE UNIVERSITY OF CHICAGO will conduct a 2-year research study of the development of basic attitudes and values toward government and citizenship during elementary school years. Robert D. Hess, associate professor of human development and education, and David Easton, professor, Department of Political Science, will direct the project.

The study will be made under a cooperative research contract with the Office of Education. Through its Cooperative Research Program, authorized by Public Law 531, the Office is providing $113,119 for support of the study, and the University of Chicago is providing services and facilities.

Educational Media Conference Held

WILL the newer educational media such as television, tape recordings, films, and autoinstructional systems (teaching machines) soon enter the U.S. public education scene on a wholesale basis? A regional information conference on research in newer educational media, held at the Pennsylvania State University on October 3–5 under the auspices of the U.S. Office of Education, found no clear answer to this question.

The conference did generally agree, however, that use of the new media *could*—and *should*—reach significant proportions in the schools at a rapid rate and that the quality of instruction need not suffer as a result and, in some instances, should be improved. Moreover, participants agreed that these newer media would contribute significantly to administrative flexibility, to better use of teaching talent, and to the accommodation of ever-increasing enrollments.

The conference was the third in a series sponsored by the Office of Education to consider the results of the extensive educational research programs supported under the provisions of Title VII of the National Defense Education Act. It was called (1)

to bring educators up to date on the status of research in newer educational media, (2) to encourage participation in such research, and (3) to raise persistent and unanswered questions about the newer media. More than 175 public school administrators, university teachers, and other educators from Delaware, Maryland, New Jersey, New York, Pennsylvania, and West Virginia attended.

Further information about the conference can be secured from Dixon Johnson, Old Main Building, Pennsylvania State University, University Park, Pa.

Survey of Summer Session Programs

THROUGHOUT the country there is much interest in finding ways of accommodating the increasing number of students who will be applying for admission to colleges and universities within the next few years. One of the ways being considered is that of making the summer session an integral part of a year-round program and by coordinating it more closely than in the past with other regular academic sessions. To provide the information needed, the Office is making a survey of the policies and procedures characteristic of the 1960 summer sessions and will later issue a report of its findings.

Such data should be of greatest value to persons who are responsible for summer session programs in assisting them to:

(1) Determine ways and means of making summer session programs more effective
(2) Determine needs for new programs or the modification or expansion of existing ones
(3) Attain an understanding of the relationship of the summer session to other facets of higher education programing.

A questionnaire, *Summer Session Programs 1960: A Comprehensive Survey of Policies and Procedures in Summer Sessions of Institutions of Higher Education*, will soon be mailed to the presidents of all institutions of higher education by Harold A. Haswell, Director, Higher Education Programs Branch, Office of Education. This questionnaire will request specific data about the summer sessions, with reference to characteristics and purposes, financing, faculty and staff, student enrollment, and present and future program offerings.

National Defense Education Act Notes

The NDEA and Graduate Education

NO SUBJECT is of greater importance to higher education than the number and quality of those who will be teaching in institutions of higher education in the future. Well-trained college teachers are already in short supply and, as a result of rapidly increasing demand, the shortage can be expected to become more serious.

Faced with this fact, the Congress in 1958 took a step toward easing the problem by enacting the National Defense Graduate Fellowship Program, title IV of the National Defense Education Act of 1958.

It is not necessary here to discuss the Graduate Fellowship Program in detail, because most readers of *Higher Education* are familiar with its operation. Suffice it to say that the act authorizes the U.S. Commissioner of Education to award, over a 4-year period, 5,500 fellowships, each for 3 years of study. The fellowships are available in new or expanded graduate programs approved by the Commissioner, and a payment of up to $2,500 per year goes to the institution with each fellowship to assist in paying for the new or expanded programs.

In 2 years about $8.6 million has been distributed for stipends—and roughly the same amount for the expansion of graduate facilities which the act requires.

Two features of the graduate fellowship program are of special interest because they break new ground in the Federal Government's efforts in behalf of higher education.

First, the Congress directs the Commissioner, by his approval of programs and award of fellowships,

to promote the widespread geographic distribution of the facilities for graduate study; and, second, the Congress excludes no fields of study, and sets no priority among fields of study, for the award of fellowships.

The requirement for geographic distribution sets the Title IV program apart from all major Federal fellowship programs, with the exception of the National Science Foundation's cooperative fellowship program, and from virtually all private fellowship programs. The philosophy of most major fellowship programs has been to find the best students, award them fellowships, and let them go to the institutions of their choice. This is a sound philosophy, but it has the limitation of concentrating fellowship holders—usually the best students—at a very few institutions. This is a situation in which the strong institutions get stronger and the weak, weaker. For example, in 1957–58 institutions in only 9 States granted 64 percent of the 8,942 doctor's degrees conferred.

Unless one assumes that only a relatively few universities are potentially capable of offering strong graduate programs or that only a few are needed to do the job that needs to be done—both dubious assumptions—then a counterweight is needed, not to compete with or undercut the existing programs, but to do something that they are not doing: to broaden the base of graduate education in the United States. The Congress provides a partial counterweight in the Title IV program, and 136 graduate schools now share the 2,500 fellowships awarded to date. Title IV fellows are studying in more than 400 graduate programs in every State except Alaska and Nevada. The programs in which they are enrolled have been judged by an advisory group of educators to be capable of offering sound training now and to give substantial promise of building and maintaining quality in the future.

The success of this experiment—it *is* an experiment—obviously cannot yet be completely evaluated. But if the enthusiasm of students and of faculty at the participating universities is any guide, this experiment is off to a good start.

The second major feature of the graduate fellowship program—its coverage of all fields of study—distinguishes it from all existing Government fellowship programs. This is truly a new departure in Federal policy, for it is the first time that the Congress has seen fit to set as a criterion the need for trained people *generally*, rather than the need for people trained in a particular subject. Thus, of the 2,500 fellowships awarded, 26 percent went to students in the humanities, 6 percent in education, 29 percent in the social sciences, 12 percent in the biological sciences, 19 percent in the physical sciences, and 8 percent in engineering. For the first time, significant Federal support is being distributed across the broad spectrum of academic fields, and it has been established as an operating principle that graduate education, in itself, is in the public interest.

It should be noted that the propriety of the policy of broad subject coverage has not been accepted by all. Indeed, a common public criticism of the Title IV program is that, by virtue of its inclusion in a *National Defense Education Act*, it ought to be limited to support of those fields which are most obviously defense-related: The sciences, mathematics, and engineering. This position, incidentally, is held by people who sincerely believe in the need for Federal assistance to higher education, as well as by those who either do not believe in Federal aid at all or would support it only as an emergency measure in the name of national defense.

A considerable controversy has centered on this aspect of the program, with newspaper editorial comment and a debate on the floor of the House of Representatives. The Office of Education has consistently supported a broad interpretation of the scope of Title IV. In explaining this stand, U.S. Commissioner of Education Lawrence G. Derthick said:

> . . . the Graduate Fellowship Program directs itself to strengthening higher education throughout the Nation toward the end of enabling the American people to make wisely the overwhelmingly complex decisions they will be called upon to make in the years ahead. The experience of the past decade has taught us very well that in providing for our strength and security no intellectual discipline can be singled out as the area of chief concern. We shall need wise men in the social sciences. The challenge to our Nation comes from all sides.

This crucial issue of Federal educational policy has been largely overlooked. Yet it is not too much to say that its resolution will shape an important aspect of Federal programs in higher education in the future. The issue is this: Should the Federal Government,

in expressing national interest in education, limit its support to those fields of study which seem, at any given moment, to be most closely related to national security, or should it support the search for knowledge in all fields?

It is more than likely that the new status of higher education as a prime object of public concern is fixed for some time to come. It should be an item of the highest priority for both the higher education community and Federal policymakers to insure that this concern is focused on objectives that will bring benefit to higher education and to the public at large.

Robert M. Rosenzweig
Program Officer
Graduate Fellowship Section

Current Program Developments

¶ Program plans recently announced for language fellowships under Title VI provide for the award of about 800 graduate fellowships for study in the summer of 1961 and the 1961–62 academic year. For 1959–60, 171 awards were made and for 1960–61, 472 awards. Fellows are expected to concentrate on one of the 83 uncommon modern foreign languages or language groups: French, German, Italian, and Spanish are specifically excluded. Graduate students apply directly to the institutions, which have set up special committees to process applications. The institutions must submit applications and their recommendations to the Office of Education by February 15. Announcement of awards will be made by April 1.

¶ Analysis of loan fund allocations to the 1,333 colleges and universities which applied for national defense student loan funds for 1960–61 shows that the size of the loan funds at participating institutions has steadily increased over the past 3 years. Although about 60 percent of the participating institutions have loan funds of less than $30,000, more money is located in institutions with loan funds totaling between $50,000 and $100,000 than in any other category. The number of institutions in that category is about 13 percent; in 1960 it was 10 percent, and in 1959, 7.5 percent. The number of institutions in the first category—from $0 to $9,999—was about 47 percent of the total in 1959, 38 percent in 1960, and 27 percent in the current year, illustrating that there is a steady decrease in the proportion of institutions with relatively small loan funds. The following table lists eight loan allocation categories, the number of institutions in each, and the amount of money involved:

1960–61 allocation categories	*Number of institutions*	*Amounts within categories*
$0–$9,999	383	$2,076,426
$10,000–$29,999	444	8,026,284
$30,000–$49,999	181	6,941,123
$50,000–$99,999	168	11,835,432
$100,000–$149,999	58	7,130,233
$150,000–$199,999	34	5,766,421
$200,000–$249,999	28	6,429,057
$250,000	37	9,250,000

¶ Directors of the 37 summer language institutes in 1960 and of the 5 academic-year institutes now in operation met with the institute staff on September 30–October 1 in New York. The meeting, held in collaboration with the Modern Language Association, was devoted to a discussion of problems encountered in organizing and staffing institutes and of proposals for improvement of the program. Among the proposals was the suggestion that next year institutes should be classified into four groups in order to bring about greater homogeneity within each institute among the secondary and elementary school teachers participating. The basis of classification would be the degree of preparation, and the four categories used would be subminimal, minimal, good, and superior.

¶ The Advisory Committee for the counseling and guidance training institute program met for the first time on October 17 to review policies and procedures of the program and to consult with the staff on future course of action. Peter P. Muirhead, director of the Financial Aid Branch, which administers the four NDEA higher education programs, briefed the committee on plans for negotiation of contracts for the conduct of 84 institutes in the summer of 1961 and 22 institutes during the 1961–62 academic year. Names of the colleges and universities to conduct the institutes will be announced on or about January 7.

¶ Two other advisory committee meetings are being held this fall: Title VI Advisory Committee to review program plans for institutes, language and area centers, fellowships, and research and studies on October 29–30, and the Title IV Advisory Committee to evaluate proposals for new and expanded programs which are now being submitted by graduate schools, on November 16. The approved programs will be announced in mid-December.

¶ A full-scale presentation of developments in the four NDEA higher education programs will be made by the staff for the Committee on Federal Relations of the American Council on Education, scheduled to meet November 29–30. This will be the third such report made to the committee. The presentation will focus on special problems being met in administering the program and plans for the coming year.

¶ Twelve language teachers drawn from higher education, secondary schools, and State and local language supervisors reviewed, on October 10–15, proposals submitted by 105 colleges and universities for language institutes to be conducted next summer and in the 1961–62 academic year. Each proposal was reviewed and rated by at least three members of the panel. The office staff is now studying the panel recommendations. Announcement of the selection of 55 summer institutes and 8 regular-session institutes will be made around December 15.

¶ It is unlikely that any part of the 1961 appropriation for language and area centers will be available for the support of additional centers in the 1961–62 academic year. This program decision was announced by Kenneth W. Mildenberger, Chief of the Language Development Program, in an October 20 bulletin to all colleges and universities which have registered interest in receiving Federal support for language and area studies. For the support of the centers program in 1961–62, $1,600,000 has been allocated, a sum sufficient to provide continued financial aid to the 46 centers currently receiving support. While no new centers are likely to be established, the announcement indicated that new or renewed expressions of interest from institutions desiring to participate in the program would be welcome. These expressions of interest will keep the Office of Education informed of possible program expansion should additional funds become available.

120,002 Student Loans Approved

DURING 1959–60, the first full year of the National Defense Student Loan Program, the 1,360 participating colleges and universities approved 120,002 loans. The number of students to whom these loans were made will be available shortly. This number will be somewhat less than the number of loans, since some institutions make more than one loan to a student during a college year. The number of loans approved in each State during 1959–60 is as follows:

1. New York	10,227	27. South Carolina	1,751
2. California	8,423	28. Arkansas	1,585
3. Pennsylvania	7,826	29. Maryland	1,527
4. Texas	5,722	30. Puerto Rico	1,524
5. Ohio	5,310	31. Colorado	1,495
6. Illinois	5,105	32. Oregon	1,202
7. Massachusetts	5,031	33. Connecticut	1,172
8. Michigan	4,280	34. West Virginia	1,162
9. Missouri	3,622	35. Nebraska	1,068
10. North Carolina	3,604	36. D.C.	981
11. Indiana	3,583	37. South Dakota	854
12. Minnesota	3,276	38. Arizona	843
13. Tennessee	2,778	39. Rhode Island	803
14. Oklahoma	2,697	40. New Mexico	720
15. Louisiana	2,600	41. New Hampshire	718
16. Iowa	2,480	42. Utah	688
17. Wisconsin	2,465	43. North Dakota	593
18. Florida	2,323	44. Maine	582
19. Georgia	2,271	45. Vermont	572
20. New Jersey	2,212	46. Idaho	524
21. Mississippi	2,196	47. Montana	463
22. Kansas	2,183	48. Delaware	208
23. Virginia	2,183	49. Wyoming	140
24. Washington	2,086	50. Hawaii	123
25. Kentucky	2,085	51. Nevada	42
26. Alabama	2,068	52. Alaska	26

Other Program Notes

Air Force Symposium

On October 17 and 18, 1960, approximately 150 national educational leaders from colleges, universities, technical institutes, Government agencies, educational foundations, industrial corporations, and the military services met in Washington, D.C., at the U.S. Department of Health, Education, and Welfare, to study long-range qualitative educational requirements of the Air Force.

Plans for the symposium grew out of a request by the Air Force Educational Requirements Board, Technical Director, Col. William H. Bowers, for advice and assistance from the director and pro-

fessional staff of the Programs Branch, Division of Higher Education, at a meeting on May 6, 1960, in Washington. From that meeting it was evident that Air Force problems in determining long-range qualitative educational requirements were closely related to the problems of other public and private institutions in long-range planning for an adequate supply of competent scientists, engineers, and executives.

In planning the program for the symposium, the AFERB Secretariat was assisted by the Programs Branch and the American Council on Education.

At the morning session on October 17, Lt. Gen. Walter E. Todd, Maj. Gen. J. V. Edmundson, Col. William H. Bowers, Col. Paul Hanley, and Dr. Morris Janowitz emphasized the Air Force need for increased educational competencies based upon an accurate determination of qualitative requirements. That afternoon, Dr. Arthur S. Adams, Dr. John T. Dailey, Miss Bertha S. Adkins, Undersecretary of Health, Education, and Welfare, Brig. Gen. Cecil E. Combs, Dr. Bowen C. Dees, and Dr. William J. McGlothlin cited the need to redirect and rededicate education to the leadership of a dynamic and democratic society. The address given by Dr. Dees of the National Science Foundation is reproduced in this issue (see p. 3).

On the second day, October 18, the conferees assembled in small working groups to discuss action programs for development of education for the general qualities of excellence, for the specialized competencies needed in future society, management education for the future, education for military qualifications, education for the professions of the future, and education of technicians to support the professions.

An analysis of comments from the educators and military representatives attending indicates that it was a profitable and successful conference. The general consensus is that symposia on this subject should be held every year. The discussions pointed up the need for a look to the future in the guidance of our educational programs, for acceleration and improvement in education for the professions, and for increased education of competent technicians to support the professions.

It appears that immediate action is imperative for the systematic exchange of information on education for the major professions. As one of the conference results, a steering committee is being organized to explore ways and means for carrying out this exchange; it is under the direction of William J. McGlothlin, Vice President of University of Louisville, and author of *Patterns of Professional Education*.

Other symposium participants have discussed adaptation of the AFERB qualitative inventory technique, together with other standard methods, in a systematic study of education for development of the general and specialized competencies needed in today's professions. Informed predictions of future advances in scientific, technological, and social research can be combined with results of studies conducted by professional societies and educational institutions to extrapolate educational needs for each of the professions. The symposium indicated that a systematic exchange of information and interprofessional cooperation can go far to foster improvement in the qualitative aspects of both military education and education for the civilian professions of the future.

Paul A. Poe
Educational Advisor
Air Force Educational Requirements Board
Air University, Maxwell AFB, Ala.

NSF Announcements

THE NATIONAL SCIENCE FOUNDATION has recently invited applications for the awards described below. Application materials and detailed information can be secured from The Fellowship Office, National Academy of Sciences—National Research Council, 2101 Constitution Avenue NW., Washington, D.C.

OEEC Fellowships for Study Abroad

THE ORGANIZATION for European Economic Cooperation is offering about 25 senior visiting fellowships to citizens and nationals of the U.S. in 1961, through the National Science Foundation.

OEEC senior visiting fellowships are designed to assist scientific and technical institutions in incorporating more quickly into their own advanced teaching and research programs the most recent developments in their own and other countries and to assist institutions in sending senior staff scientists, mathematicians, and engineers to study new techniques and developments at advanced research and educational institutions. The fellowships will usually be for periods of from 8 weeks to 6 months; in exceptional

cases a maximum period of 1 year may be approved. The program will allow study in most fields of science and technology, that is, the mathematical, physical, biological, and engineering sciences. Awards will not be made in the social sciences or medicine.

Public or publicly supported scientific or technical institutions, or nonprofit private training or research institutions in the United States, its territories, or possessions may nominate persons or candidates for OEEC senior visiting fellowships. An institution may nominate persons who (*a*) are citizens or nationals of the United States as of April 3, 1961; (*b*) have full professional standing in the field in which the fellowship is made; (*c*) have at least 5 years' experience in research, teaching, or other relevant professional work; and (*d*) have the necessary linguistic capability.

In view of the sponsorship of this program, applicants are encouraged to apply to study in a country that is a member of or is cooperating with the Organization for European Economic Cooperation: Austria, Belgium, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

An OEEC senior visiting fellow will receive a subsistence allowance of $10 a day, a travel allowance covering air-tourist transportation to his fellowship institution and return. In addition, he will be permitted to receive, during the period of his award, his regular salary and/or appropriate allowances provided by or approved by his nominating institution.

Fellowship applications must be received by the NAS-NRC not later than January 6, 1961. Awards will be announced on April 17, 1961.

1961 NATO Fellowships

IN 1961 about 50 North Atlantic Treaty Organizations fellowships in sciences will be awarded to U.S. citizens and nationals to encourage study of the sciences abroad. The awards will be in the mathematical, physical, and engineering sciences; medical and biological sciences, including anthropology and psychology but excluding clinical psychology; in certain social sciences; and in interdisciplinary fields overlapping two or more scientific disciplines.

An applicant must have special ability and aptitude for advanced training in science and, by the time the fellowship begins, either have an earned doctoral degree in one of the sciences listed when his fellowship begins or have had research training and experience equivalent to that represented by the doctoral degree.

Applicants are encouraged to apply to study in a country that is a member of NATO: Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Turkey, and the United Kingdom; these countries also grant NATO fellowships to their own citizens. Awards to U.S. citizens and nationals are not, however, restricted to study in a NATO country, and consideration will be given to those planning study elsewhere. NATO fellows will receive $4,500 for tenures of a full year and $3,375 for the academic year. Limited round-trip travel and dependency allowances will also be provided.

At the request of the Department of State, the National Science Foundation will direct United States participation in the program. Panels of scientists appointed by the National Academy of Sciences-National Research Council will evaluate application for the National Science Foundation. Fellows will be selected solely on the basis of ability. Fellowship applications must be received by the NAS-NRC by December 19, 1960. Awards will be announced on April 3, 1961.

NSF Postdoctoral Awards

APPLICATIONS will be accepted through December 19, 1960, for National Science Foundation fellowships under the postdoctoral fellowship program.

Awards will be made in the mathematical, physical, medical, biological, and engineering sciences, including anthropology, psychology (excluding clinical psychology), certain interdisciplinary fields comprised of overlapping fields among two or more sciences (such as oceanography, meteorology, biochemistry, biophysics, and geochemistry), and selected science fields.

To be eligible for these fellowships, applicants must be citizens or nationals of the United States, possess special aptitude for advanced training, and must hold the doctoral degree or have equivalent education and experience. Postdoctoral fellows will be selected on the basis of ability as indicated by letters of recommendation, academic records,

and other evidence of scientific competence. Applicants' qualifications will be evaluated by panels of scientists appointed by the National Academy of Sciences-National Research Council. Selection of approximately 165 Fellows will be made by the National Science Foundation.

A stipend of $4,500 per year will be awarded to successful applicants. Dependency allowances will be made to married fellows. Fellows may engage in study and/or research at any appropriate nonprofit institution in the United States or any appropriate nonprofit foreign institution. A limited allowance to aid in defraying a fellow's cost of travel will also be available.

Applications must be received by NAS–NRC not later than December 19, 1960. All applicants will be notified by letter on March 15, 1961, as to the disposition of their applications.

NSF In-Service Institutes for 1961–62

THE NATIONAL SCIENCE FOUNDATION will accept proposals through December 15, 1960, from educational institutions for in-service institutes, for secondary school science and mathematics teachers, to be held during the 1961–62 academic year.

In sponsoring the in-service institutes, NSF's immediate objective is to provide an opportunity for secondary teachers and supervisors to increase their knowledge of science and mathematics. Its long-range objective is to improve the curriculums for science teachers by making it possible for college and university teachers to get new insight into the problems of secondary teachers and a firm basis for revising courses and curriculums of teacher education.

NSF grants provide the costs of instruction and administration for sponsoring institutions. Participating teachers receive modest allowances for travel and books and are exempt from payment of tuition and fees. NSF is supporting 191 in-service institutes for secondary school teachers in 1960–61 and expects to support more than 200 in 1961–62.

Institute meetings are usually held outside regular school hours—evenings, Saturdays, or late afternoons and may involve laboratory and field work, as well as classroom instruction so that teachers may continue their studies while they are engaged full time in teaching.

The grants permit sponsoring institutions flexibility in the design and administration of the institutes. Suggestions and forms for the preparation of proposals are available on request from the Foundation.

NSF Graduate Fellowships

NATIONAL SCIENCE FOUNDATION Graduate Fellowships for advanced study in the sciences will be awarded in the mathematical, physical, medical, biological, and engineering sciences, including anthropology, psychology (excluding clinical psychology), and the following social sciences: Geography, mathematical economics, econometrics, demography, information and communication theory, experimental and quantitative sociology, and the history and philosophy of science. Also included are interdisciplinary fields which are comprised of overlapping fields among two or more sciences. The fields of research and study covered by these awards are limited to those which conform to accepted standards of scientific inquiry by fulfilling the requirements of the basic scientific method as to objectivity, verifiability, and generality.

To be eligible for graduate fellowships, applicants must be citizens or nationals of the United States and have demonstrated ability and special aptitude for advanced training in the sciences.

Fellows will be selected on the basis of ability as attested to by letters of recommendation, academic records, and other evidence of scientific competence. Applicants are required to take the Graduate Record Examination. Applicants' qualifications will be evaluated by panels of scientists appointed by the National Academy of Sciences—National Research Council. Final selection of fellows will be made by the National Science Foundation.

Stipends for National Science Foundation Graduate Fellowships vary with the academic status of the fellows. First-year fellows—students entering graduate school for the first time or those who have had less than 1 year of graduate study—will receive annual stipends of $1,800. Fellows who need one final calendar year of training for the doctoral degree will receive annual stipends of $2,000. A dependency allowance of $500 per annum for spouse and each dependent child will normally be available to married fellows. Tuition, laboratory fees, and limited travel allowances will also be provided. The closing date for the receipt of applications is January 6, 1961. Final selection of fellows will be announced March 15, 1961.

science and technology, clearly must have available an adequate supply of persons who are well trained in science and technology. But the needs of the Air Force are not unique, and other requirements throughout the economy will intensify the difficulties of obtaining the requisite numbers of able persons who have been educated in science and engineering. Unless we can learn how to assure an adequate base of understanding of science and applied science early in our educational system, and unless we can then move forward to make sure that the things we thus learn are actually embodied in practice, the 1970's will see a much greater deficit of scientific and technological manpower than we have yet encountered.

I feel that the Air Force should be congratulated for having established the Air Force Educational Requirements Board. That board deserves credit for its efforts to come to grips with the long-range problems of the Air Force. From earlier contacts with the Air Force on similar matters, I have been much impressed with the degree to which problems in this area have been recognized and solutions sought. I have sometimes worried, however, over one point: it has seemed to me that the military and some of their educational advisers from university life have been inclined to feel that educational problems are usually susceptible to relatively easy and rapid solutions. I firmly believe that the problems that we face in education are as difficult as many of those that we face in development of our most complex weapons systems. Lead times of from 5 to 10 years are common in connection with many of the current Air Force technological requirements. Adequate solutions of some of the problems that are of major educational importance are sure to require comparable or even much greater periods of time.

The need for increased emphasis on the inclusion of fundamental ideas in the training of individuals who are to become scientists or applied scientists is now generally accepted in higher education. There are many differences of opinion, however, as to how this relatively simple concept can best be put into practice.

The Air Force itself—along with the other military services—can play an important role in improving education in the United States. In peacetime a large part of the energy of each military service must go into education and training. In general, a primary goal of each military service is to train specific persons for carrying out a limited range of duties. During and since World War II the specialized techniques that have been developed for accomplishing these training tasks have been impressive. I sometimes wonder if there has been an adequate exchange of information between the military services and the educational community concerning the lessons that have been learned by the Army, Navy, and Air Force in this domain.

At the higher levels of education, especially, it is possible for the military services to provide "laboratories for educational research" which could be of tremendous importance to our entire educational system. Someone has said that reorganizing an academic curriculum is like trying to move a graveyard. This is especially true of some of the more conventional fields of study. For example, the problem of reorganizing or modifying in any major way the curriculum of the average engineering school turns out to be an almost insuperable task. If you talk with engineering professors as individuals, many of them will freely admit that radical changes are needed in engineering education in order to bring it in line with the present and future needs of our technological society. But this sentiment is somehow largely dissipated when the problem of discontinuing a course of study or a department is brought into the discussion. Changes are taking place, of course, but the problem is how can one assure an adequate rate of change. It is possible that the military services, were they to encourage more well-designed experimentation and innovation in their educational facilities, could provide a desirable kind of stimulus to the educational institutions of the country.

We ordinarily think of education for scientists and engineers as being restricted to our institutions of higher education. This is a serious error. One of the first things that we learned at the National Science Foundation nearly 10 years ago (when the Foundation was just getting underway) was that the problem of training to the doctoral degree larger numbers of scientists was primarily a problem of finding enough graduating college seniors who had

been prepared and motivated to undertake graduate study. As we traced the cause of this phenomenon back further in the educational system, we found general agreement that a great deal more attention needed to be paid to the teaching of the sciences at the high school level. Still more recently evidence has accumulated that we need to go even further back and look at the teaching of general science at the junior high level and the teaching of arithmetic and simple scientific facts in the elementary school. I therefore make no apologies for discussing the problems of science teaching at the preuniversity levels.

We do not know enough about how to educate, and we never will unless we put much more money and energy into analyzing this problem. Even now, however, we know of many specific actions that will lead to improvements. We may not be able to describe the perfect teacher or the perfect teacher-training program, but we can be sure a well-prepared teacher—one who not only knows his subject but also has learned some of the obvious do's and don'ts of good teaching—is better than a poorly prepared teacher. We can be sure that students learn better in a room that is well lighted than they do in one which is poorly lighted. It is certain that a chemistry textbook which presents outmoded or misleading concepts is not as good as one which avoids these errors.

Hence we need not worry about being unable to act even though our present knowledge is incomplete. There are many problems we can and should attack at once. Excellent and important work is now going on, but we should not rely on empiricism in this field forever—hence my plea for an adequate educational research program.

The matters I have been discussing are directly related to the problem of developing an improved and fully appropriate educational program for our future scientists and engineers. My argument may be formulated, in summary form, as follows:

- Scientific and technological progress is essential to our security, and America still has not fully awakened to this fact.
- We therefore need to stress those improvements in our educational system which will contribute most effectively to increasing our scientific and technological potential.
- Such improvements, although needed at the undergraduate and graduate levels, must extend throughout the entire educational system. Science education should become an integral element of the entire instructional process, just as science and technology are already inescapably interlaced with our daily lives and future welfare. Scientific literacy for *all* our people must become our goal.
- The needed improvements, moreover, are not confined to scientific subjects; hence, although this is only one of many reasons why we should take more effective action in other fields, we need to improve instruction in these other areas so that our science education can be made more nearly adequate to our needs.
- Because of our inadequate knowledge of how to improve our educational system—at all levels and in all fields—we should push for an extensive program of educational research—a program involving practitioners and scholars from all fields of endeavor.
- While we are conducting such research, we should continue to support obviously desirable efforts to improve our instructional programs from the graduate level down to the elementary school.

It is not as an alarmist but as a realist that I say our national welfare and our survival as a free people will rest on decisions we will make in the next few years on the role of science and technology and the education of those who are to man our science and engineering classrooms and laboratories. We were frighteningly complacent on this score when the first Sputnik was launched—and we may again be drifting toward self-satisfaction. This we must resist.

Too often today the phrase "we must" is used simply to cloak a generality or a platitude; too seldom is it used to indicate a specific and feasible course of action. American education—higher and lower—is a flexible organism. Varied as its controls are, there are nonetheless major possibilities for cooperative and supporting action—action involving cooperation between elementary schools and high schools, public and private; cooperation between universities and colleges and high schools—and many other combinations and permutations of the various elements of our system. The States and communities are increasing their support of educa-

tion, and this trend is likely to continue. Federal assistance is already being made available in dealing with many of the existing problems, and it seems clear that more help can and will be made available through the various units of the Federal establishment which have responsibilities for education and for science.

The things that the American people believe to be "musts" can be done for we have more than adequate resources in this country to do these necessary things. The crucial problem is to engineer agreement on the things that most need doing. Once we have accomplished this aim, we can, in my view, unquestionably mobilize the dollars and the personnel required to move forward in a series of steps commensurate with our present needs and our traditional goals. Inventiveness in developing appropriate action programs, leadership in selling them to the decision-makers, and wisdom in administering those programs which are eventually approved—these are the factors which will lead us toward educational improvements which will insure our security.

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From the Office of Education

Educational Trends in the Caribbean: European Affiliated Areas, by Charles C. Hauch. Bulletin 1960 No. 26. U.S. Government Printing Office, 1960. Paper, 153 p. 60 cents. (OE–14043.)

Electrical Technology, A Suggested 2-Year Post High School Curriculum, Area Vocational Education Program Series No. 1. Washington, U.S. Government Printing Office, 1960. Paper, 118 p. 75 cents. (OE–80006.)

Electronic Technology, A Suggested 2-Year Post High School Curriculum, Area Vocational Education Program Series No. 2. Washington, U.S. Government Printing Office, 1960. Paper, 97 p. 70 cents. (OE–80009.)

Financial Statistics of Institutions of Higher Education, 1957–58, U.S. Department of Health, Education, and Welfare, Office of Education, Washington 25, D.C. Circular, 7 p. (OE–52001.)

Advance data: Publicly and privately controlled institutions; and 4-year institutions and junior colleges, September 1960.

The Gifted Student, Cooperative Research Monograph No. 2, Washington, U.S. Government Printing Office, 1960. Paper, 83 p. 35 cents. (OE–35016.)

This monograph, the second of a series, is composed of four research projects concerning elementary and secondary students. It deals with (1) inquiries into the different meanings and values attached to the idea of giftedness by the several groups in our society most involved in the adolescent's life—his parents, teachers and fellow associates; (2) investigations of two different types of gifted adolescents; (3) occupational choices and aspirations of these students; and (4) what the highly intelligent and highly creative adolescents want to do as adults.

The National Defense Education Act, Fiscal Year Ending June 30, 1959: A Summary of Programs Administered by the Office of Education Submitted Under Public Law 85–864. Washington, U.S. Government Printing Office, 1960. Paper, 62 p. 45 cents. (OE–10004.)

The National Defense Counseling and Guidance Training Institutes Program, A Report of the First 50 Institutes, by Leona E. Tyler. Washington, U.S. Government Printing Office, 1960. Paper, 93 p. 35 cents. (OE–25011.)

Reports on the first short-term counseling and guidance training Institutes initiated under Title V–B of the National Defense Education Act of 1958. Discusses the structure, the principles employed under the V–B of the act, and the contributions that this program has made.

News and Reports, Title VII—New Educational Media. Washington, U.S. Office of Education, 1960. Paper, 31 p. (OE–34002–2.)

Describes projects given out under Title VII of the National Defense Education Act (Public Law 85–864) in the following areas: Auditory devices, motion pictures, multi-media, non-projected materials, still projected materials, teaching machines, and television.

Professional Preparation for Teachers of Exceptional Children: An Overview, by Romaine P. Mackie, Lloyd M. Dunn, *and* Leo F. Cain. Washington, U.S. Government Printing Office, 1960. Paper, 139 p. 45 cents. (Bulletin 1959, No. 6.)

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Projects Initiated Under the Cooperative Research Program, July 1, 1956–September 30, 1960. Cooperative Research Program, Office of Education, Department of Health, Education, and Welfare, Washington 25, D.C. Paper, 47 p. (OE–12000A.)

State Standards for Public Libraries, by Rose Vainstein *and* Marian Magg. Bulletin 1960, No. 22. U.S. Government Printing Office, 1960. Paper, 85 p. 35 cents. (OE–15010.)

Teacher Competencies in Trade and Industrial Education by John P. Walsh. U.S. Government Printing Office, 1960. Paper, 64 p. 30 cents. Vocational Division Bulletin No. 285. (OE–84006.)

The Technical Assistance Training Program in Education, Annual Report, 1958–59. Washington, U.S. Office of Education, 1960. Paper, 41 p. (OE–14046.)

Reports on training activities in the Far East, Near East and Africa, Latin American area, European area, and special activities.

Technology in the Classroom: Challenges to the School Administrator, by Gene C. Fusco. A reprint from *School Life*, March and May 1960. Washington, U.S. Office of Education. Paper, 12 p. (OE–34004.)

Other Government Agencies

Health, Education, and Welfare Indicators, July–August 1960. Office of Program Analysis, Office of the Secretary. Washington, U.S. Government Printing Office, 1960. Paper, 44 p. 35 cents.

This monthly publication highlights current information on health conditions, educational problems, consumer interests, social security, welfare, population, vital statistics, etc. Reviews and interprets month-to-month changes and relationships.

Programs of the U.S. Department of Health, Education, and Welfare, 1960 Edition, Office of the Secretary—Office of Program Analysis. Washington, U.S. Government Printing Office, 1960. Paper. $1.50.

This annual handbook describes programs of the Department of Health, Education, and Welfare, including The Office of the Secretary, Public Health Service, Food and Drug Administration, Office of Education, Social Security Administration, Office of Vocational Rehabilitation, and Saint Elizabeths Hospital.

Nongovernment Publications

Obtain direct from the publisher. Prices are indicated when known.

Fellowships for Health Research, A Report on a Meeting of the Committee on Research of the National Health Council, April 21, 1960. 1790 Broadway, New York, the National Health Council. 1960. 24 p. $1.

Provides information on fellowship and trainee programs of National Research Council, National Science Foundation, nongovernment agencies, Office of Education, Public Health Service.

Fellowships in the Arts and Sciences, 1961–62, Fourth Edition, by Michael Edmund Schiltz. Washington, The Association of American Colleges, 1960. Processed, 150 p. (Copies may be purchased at $3 each from Publications Division, American Council on Education, 1785 Mass Avenue, NW., Washington 6, D.C.)

Lists predoctoral, postdoctoral, and some study awards under broad disciplinary fields: General, humanities, natural sciences, and social sciences. Indicates required qualifications, period of award and stipends; explains procedures for making application, time schedules, and methods used in reviewing applications.

Directory of University Research Bureaus and Institutes, First Edition, 1960. Gale Research Company, 34th Floor, Book Tower, Detroit 26, Mich. 28 pages, 8½″ x 11″. $20.

A reference guide to university research bureaus, institutes, centers, experiment stations, and laboratories, set up on a permanent basis and carrying on a continuing program of research in specialized fields. Contains 1500 listings in 250 fields. Each listing includes the following data: Official name of bureau or institute, address, name of sponsoring college or university, name and title of director, year founded, size of professional staff and non-professional staff, title and frequency of issue of serial publications, description of research program and activities, and list of professional meetings, special programs and seminars. (Library of Congress catalog card number: 60–14807.)

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